REMARKS

Favorable reconsideration is respectfully requested in view of the foregoing amendments and the following remarks. Applicants also hereby incorporate the Appeal Brief filed December 19, 2007 including the arguments made therein.

I. CLAIM STATUS AND AMENDMENTS

Claims 1-63 and 81-92 were pending in this application when last examined.

Claims 1-47 and 81-91 were examined on the merits and stand rejected.

Claims 48-63 and 92 were withdrawn as non-elected subject matter.

Claim 1 is amended to recite "a continuous optical waveguide". Such an amendment merely clarifies that the planar optical waveguide is a single or continuous planar optical waveguide for the claimed invention. Applicants note that support for this amendment can be found throughout the specification and particularly in the use of "a planar optical waveguide". Please also see page 1, line 11 and Figure 1 of the specification as filed.

Applicants further note that PCT/EO 00/07529, the original PCT application, always mentions "einen planaren Wellenleiter". The German language unspecifically uses "ein" for "one" or "a".

In the biosensor art, waveguides are divided into (1) "a" planar waveguide, that is a single continuous planar waveguide, and (2) two or more waveguides. For example, Applicants note that pages 4-10 of the application is concerned in part with single planar waveguides. On the other hand, Neuschäffer et al. (WO 96/35940) on page 10, lines 15- 26, indicates "wenigstens zwei getrennte wellenleite Bereiche," which means "at least two discrete waveguiding areas" as an essential feature.

Thus, the context of the wording "einen planaren Wellenleiter" (singular) in the original PCT application means a continuous, "one" or "a single" planar waveguide.

Thus, no new matter has been added.

II. OBVIOUSNESS REJECTIONS

Claims 1-34, 38-40, 42-47, 81-84 and 86-91 were rejected by the Examiner as being obvious from Neuschäfer (WO 96/35940) in view of Coassin (US 6,660,233) in section 1 on pages 2-9 of the Office Action.

Claims 35-37 were rejected by the Examiner as being obvious from Neuschäfer in view of Coassin and further in view of Hashimoto (US 6,480,639) in section 2 on page 9 of the Office Action.

Claims 41 and 85 were rejected by the Examiner as being obvious from Neuschäfer in view of Coassin in section 3 on pages 9 and 10 of the Office Action.

Applicants respectfully traverse these rejections as applied to the amended claims.

The subject matter of independent claim 1 is directed to a device comprising: a sensor platform having a continuous planar optical waveguide (see Fig. 1 (element (a)); page 14, lines 1-2; page 15, lines 13-25; page 30, lines 6-7); a sealing layer forming, either directly or with a sealing medium, a tight seal with said planar optical waveguide (see Fig. 1 (element (g)); page 14, lines 1-5; page 30, lines 7-10); and a plurality of recesses opening at least towards said sensor platform, which form a corresponding plurality of sample compartments (see Fig. 1; page 14, lines 5-10; page 30, lines 10-12), said plurality of sample compartments being arranged with at least two sample compartments in a length direction and at least two sample compartments in a width direction (see Fig. 1; page 12, line 3; page 14, lines 5-8), wherein each of said sample compartments has different biological or biochemical recognition elements for specific recognition and binding of different analytes immobilized in five or more discrete measurement areas on said planar optical waveguide (see Fig. 1 (element (d)); page 14, lines 9-15; page 30, lines 13-16), said measurement areas being arranged with at least two measurement areas in a length direction and at least two measurement areas in a width direction (see Fig. 1; page 12, line 3; page 14, lines 5-10), said measurement areas are in optical interaction with excitation light emanating from said optical waveguide, as part of said sensor platform which forms a demarcation of said sample compartments (see Fig. 1; page 14, lines 12-15; page 30, lines 16-17; page 31, lines 1-3), and said sample compartments are operable to have sample or reagent solutions received therein cleared therefrom and to have further sample or reagent solutions supplied thereto (see Fig. 1; page 14, lines 15-19; page 30, lines 19-20).

Neuschäffer et al. (WO 96/35940) defines a sample compartment as a recess comprising a strip-like formation of wave guiding regions interrupted by dividing regions so that wave guiding regions are optically or physically separated. The wording wave guiding region and measurement area is equivalent as mentioned in the description of fig. A to 1d and 2a to 2d on p. 9 to p. 10. The size and width of the wave guiding regions can be varied. The width strip-formed wave guiding regions may vary from 0.5 to 20 mm (p.10, §. 2 and 3). The production of various sensor platforms and particularly the division of the waveguide into wave guiding regions is described in the examples. For clarity purposes the enclosed Fig. 2 shows our understanding of a sensor platform in view of Neuschäffer et al. applied to a well plate, wherein a well comprises a plurality of measurement areas, and wherein one measurement area is placed on one wave guiding region.

Coassin et al. (US 6,660,233) teaches the possible use of an array on a waveguide but does not give any information of the construction of usable wave guide. Coassin et al. teaches that strip-like formation is equivalent to a 2-dimensional arrangement.

The Office argues that the claimed invention is obvious over the strip-like arrangement of Neuschäffer et al. in view of the 2-dimensional arrangement of Coassin et al. as a functional equivalent to known strip-like arrangements.

We respectfully disagree with this statement regarding when an array on a wave guide is used. In particular, both arrangements of measurement areas may be equivalent with regard to the binding of recognition elements. However both arrangements are not optically equivalent when an array is used on a wave guide. Because the direction of light propagation in the wave guide is parallel to the direction of the excitation light, the two dimensions of a two-dimensional array are not equivalent regarding to their excitation by generated evanescent field. Thus, Coassin et al. is not a functional equivalent.

Further, as mentioned by the Office, a skilled artisan would rely upon the known state of the art and particularly on Neuschäffer et al. for the construction of the wave guiding structure. However, Neuschäffer et al. explicitly describe disadvantages of a continuous wave guiding layer as follows (p. 5 last § to p. 6 first §):

- "the excitation light excites all of the fluorophore labeled molecules. Selection of measurement sites according to location is thus not possible",

- "evanescently back coupled fluorescence fluorescence photos may contribute to the signal from the neighbouring dot and thus lead to measurement errors:"

Therefore a skilled artisan combining the sensor platform of Neuschäffer et al. and the 2-dimensional array of Coassin et al. would be motivated to build a sensor platform wherein one measurement area would be deposited on one waveguiding region that is separated from next guiding region lengthwise and crosswise to the direction of light propagation. This construction is shown in attached Fig. 3. A skilled artisan would reject such construction as it would require considerable effort in the preparation of the wave guide and would not allow desired miniaturization of the sensor platform.

Please also note that the optical properties of the construction of Fig. 3 would be counterproductive for the generation of an evanescent field since each field would have to be generated separately in each planar waveguiding region and not be too small in the light propagation direction. Thus, Applicants respectfully submit that Neuschäffer et al. in view of Coassin et al. fails to teach or suggest the present invention. Furthermore, Applicants note that the teachings of these references would not motivate a skilled artisan to create the claimed invention. On the other hand, because of the problems with miniaturization and light propagation, a skilled artisan would be taught away from the claimed invention as he or she would not have a reasonable expectation of success to arrive at the claimed invention.

To simplify the device of Neuschäffer et al. in view of Coassin et al. the man skilled in the art might consider part of the teachings of Herron et al. (WO 94/27137), cited in both Neuschäffer et al. and the description of the present invention, using a continuous wave guide.

Heron et al. (WO 94/27137) describes a biosensor comprising a continuous wave guide comprising wells containing a plurality of patches. The biosensor is about 2.5 cm wide and 4.3 cm long. Such is illustrated in attached Fig. 4. Heron et al. teaches that the elimination of separation walls crosswise to the direction of light propagation increases the sensitivity of the assay. The increased sensitivity results from 1) avoiding leakage of wave guiding light through the walls and 2) avoiding scattering of the excitation light which may excite unbound tracer molecules outside the region of evanescent penetration, undesirably increasing background fluorescence (p. 17, lines 23-30). Heron el al. also mentions problems of uniformity of the intensity of the evanescent field within a continuous wave guide (p. 17, lines 14-15) and a special feature (portion 650) helping to equalize the intensity of light within the waveguide.

Enclosed Fig. 5 shows our understanding of a sensor platform planned in view of Neuschäffer et al., Coassin et al. and Herron et al. (WO 94/27137) provided that the skilled artisan would consider the observation of Heron et al. applicable to a miniaturized construction. It should be noted that the present invention does not completely eliminate walls crosswise to the direction of light propagation but only between measurement areas within a well.

As a comparison, a biosensor according to the claimed invention is shown in Fig. 6. The planar wave guide is continuous both lengthwise and crosswise to the direction of light propagation under a two-dimensional array of measurement areas. It is also continuous under a two-dimensional arrangement of sample compartments opening at least towards said sensor platform. Considering all efforts made in the state of the art (and particularly Herron et al.) to improve intensity of the evanescent field in a continuous wave guide and avoid problems of leakage or scattering of light it is the merit of the claimed invention to provide an easily produced miniaturized biosensor device with high sensitivity using a continuous wave guide as substrate for a two-dimensional arrangement of measurement areas within a two-dimensional arrangement of sample compartments.

Finally, Applicants note that Hashimoto fails to remedy the above-noted deficiencies in the cited references.

Thus, Applicants note that the combination of these references fails to teach each and every element of the claimed invention. Applicants further note that the cited references fail to suggest the claimed invention which provides an easily produced miniaturized biosensor with high sensitivity using a continuous waveguide as a substrate for a two-dimensional arrangement of measurement areas within a two-dimensional arrangement of sample compartments.

Thus, Applicants note that these rejections, as applied to the amended claims, are untenable and should be withdrawn.

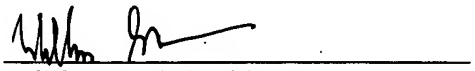
CONCLUSION

In view of the foregoing amendments and remarks, the present application is in condition for allowance and notice to that effect is hereby requested.

If the Examiner has any comments or proposals for expediting prosecution, please contact the undersigned at the telephone number below.

Respectfully submitted,

Andreas ABEL et al.

By: 

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July 1, 2008

ATTACHMENTS

Attachment A: Fig. 2 – Neuschäffer et al. in a well-plate

Attachment B: Fig. 3 – Neuschäffer et al. in view of Coassin et al.

Attachment C: Fig. 4 – Heron et al. (WO 94/27137)

Attachment D: Fig. 5 – Neuschäffer et al. in view of Coassin et al. and Heron et al. (WO 94/27137)

Attachment E: Fig. 6 – Present Invention